

Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS)

✓ DISEASE AND EPIDEMIOLOGY

Clinical Description:

Infection with HIV produces a spectrum of disease that progresses from a clinically latent or asymptomatic state to AIDS. AIDS represents the most advanced stage of disease.

As the immune system weakens, a variety of complications start to appear.

- Some people have a flu-like illness within a month or two after exposure to the virus. This illness may include fever, headache, fatigue, enlarged lymph nodes, or a rash. These symptoms usually disappear within a week to a month and are often mistaken for those of another viral infection.
- Symptoms that may be experienced months to years before the onset of Acquired Immunodeficiency Syndrome (AIDS) include: lack of energy, weight loss, frequent fevers and sweats, persistent or frequent yeast infections (oral or vaginal), persistent skin rashes or flaky skin, pelvic inflammatory disease that does not respond to treatment (in women), and short-term memory loss.
- In people with AIDS, opportunistic infections are often severe and sometimes fatal because the immune system is so ravaged by HIV infection that the body cannot fight off certain bacteria, viruses, fungi, parasites, and other microbes. Symptoms of opportunistic infections common in people with AIDS include: coughing and shortness of breath, seizures and lack of coordination, difficult or painful swallowing, mental symptoms such as confusion and forgetfulness, severe diarrhea, fever, vision loss, nausea, abdominal cramps, vomiting, weight loss, extreme fatigue, and severe headaches.

Causative Agent:

The human immunodeficiency virus (HIV) is a retrovirus. HIV type 1 (HIV-1) and, less commonly, HIV-2, a related virus that is extremely uncommon in the United States but more common in West Africa.

Differential Diagnosis:

The most common symptoms associated with acute infection occurring 2-6 weeks after exposure are often associated with influenza-like illness. A rash may also develop during the acute infection and for up to a week after. The differential diagnosis includes infectious mononucleosis, pityriasis rosea, secondary syphilis, drug reaction, or toxic erythema due to another infectious cause.

Laboratory identification:

HIV infection is usually diagnosed by tests for antibodies against HIV-1. Some combination tests also detect antibodies against HIV-2. The antibodies usually show up in the blood between 6 weeks and 6 months after infection by HIV. The period of time in which a person is infected and potentially infectious, but before an antibody response is mounted, is known as the “window period”.

Treatment:

Primary care physicians are encouraged to participate actively in the care of HIV-infected patients in consultation with specialists who have HIV expertise. Guidelines for the treatment of HIV/AIDS are updated on a regular basis. For updated treatment guidelines, please see:

www.cdc.gov/hiv/topics/treatment

or

www.hrsa.gov/publications/january2007

Case Fatality:

More than 20 million people with HIV/AIDS have died since the first AIDS cases were identified in 1981. As of December 31, 2002, an estimated 501,669 people with AIDS in the U.S. had died. The introduction of new antiretroviral therapies for HIV/AIDS has enabled individuals to live longer.

Reservoir:

Humans are the only natural host.

Transmission:

HIV is spread through sexual contact with an infected person, by sharing needles and/or syringes (primarily for drug injection) with a person who is infected with HIV, or less commonly (and now very rarely in countries where blood is screened for evidence of HIV infection), through transfusions of infected blood or blood clotting factors. Infants born to HIV-infected women may become infected before or during birth, or through breastfeeding after birth.

Susceptibility:

Susceptibility is unknown, but presumed to be general: race, gender, and pregnancy do not appear to affect susceptibility to HIV infection or AIDS. The presence of other sexually transmitted infections, especially if ulcerative, increases susceptibility. Recent data indicates that circumcision of males is protective against infection.

Incubation period:

Among patients enrolled in large epidemiologic studies, the median time from infection with HIV to the development of AIDS-related symptoms has been approximately 10–12 years in the absence of anti-retroviral therapy. However, researchers have observed a wide variation in disease progression. Approximately 10% of HIV-infected people in these studies have progressed to AIDS within the first 2–3 years following infection,

while up to 5% of individuals in studies have stable CD4+ T cell counts and no symptoms even after 12 or more years.

Period of communicability:

The period of communicability is not known precisely. It begins early after onset of HIV infection and presumably extends throughout life. Infectiousness with HIV may be variable; anyone with a positive test for HIV antibody and/or detectable HIV in the blood should be considered infectious. The degree of correlation between quantity of circulating virus and infectiousness is not clearly established, although lower viral counts appear to reduce the risk of transmission. HIV is a chronic infection and persons with HIV remain infectious indefinitely.

Epidemiology:

At the end of 2003, an estimated 37.8 million people worldwide (35.7 million adults and 2.1 million children younger than 15 years old) were living with HIV/AIDS. Approximately two-thirds of these people (25.0 million) live in Sub-Saharan Africa; another 20 percent (7.4 million) live in Asia and the Pacific Islands. Worldwide, approximately 11 of every 1000 adults aged 15–49 are HIV-infected. In Sub-Saharan Africa, about 7.5% of all adults in this age group are HIV-infected. Women account for nearly half of all people worldwide living with HIV/AIDS. An estimated 4.8 million new HIV infections occurred worldwide during 2003; that is, about 14,000 infections each day. More than 20 million people with HIV/AIDS have died since the first AIDS cases were identified in 1981.

The CDC estimates that 850,000–950,000 U.S. residents are living with HIV infection, one-quarter of who are unaware of their infection. Approximately 40,000 new HIV infections occur each year in the U.S., about 70% among men and 30% among women. Of these newly infected people, half are younger than 25 years of age. Among new infections in men in the U.S., the CDC estimates that approximately 60% of men were infected through sexual contact with other men, 25% through injection drug use, and 15% through heterosexual sex. Among new infections in women in the U.S., the CDC estimates that approximately 75% of women were infected through heterosexual sex and 25% through injection drug use.

The estimated number of AIDS diagnoses through 2005 in the U.S. is 984,155. The estimated number of new pediatric AIDS cases (cases among individuals younger than age thirteen years) in the U.S. fell from 952 in 1992 to 68 in 2005. The estimated rate of adult/adolescent HIV/AIDS diagnoses in the U.S. in 2005 (per 100,000 population) was 71.3 among blacks, 27.8 among Hispanics, 10.4 among American Indians/Alaska Natives, 8.8 among whites, and 7.4 among Asians/Pacific Islanders. As of December 31, 2005, an estimated 550,394 people with AIDS in the U.S. had died.

A cumulative total of 2,272 AIDS cases and 887 HIV-positive cases have been reported in Utah through December 31, 2006. A total of 1,120 AIDS cases have died. Cumulative totals show the majority of HIV/AIDS cases were white. Male-to-male sexual contact is

the most common means of HIV/AIDS exposure followed by male-to-male/injecting drug use.

✓ PUBLIC HEALTH CONTROL MEASURES

Public health responsibility:

- Investigate all suspect cases of disease and fill out and submit appropriate disease investigation forms.
- Provide education to the general public, clinicians, and first responders regarding disease transmission and prevention.
- Identify clusters or outbreaks of this disease.
- Identify sources of exposure and stop further transmission.

Prevention:

HIV/AIDS prevention programs can be effective only with full community and political commitment to change and/or reduce high HIV-risk behaviors. Some of these elements cannot, at this time, be discussed in public schools.

- Public education must stress that having multiple and especially concurrent and/or overlapping sexual partners or sharing drug paraphernalia all increase the risk of HIV infection.
- The specific needs of minorities; persons with different primary languages and those with visual, hearing or other impairments must be addressed.
- People must be taught to avoid or reduce risky behavior.
- The only absolute way to avoid infection through sex is to abstain from sexual intercourse or to engage in mutually monogamous sexual intercourse only with someone known to be uninfected.
- Latex condoms must be used correctly every time a person has vaginal, anal, or oral sex. Only water-based lubricants should be used with male condoms.
- Expansion of facilities for treating drug users reduces HIV transmission. Programs that instruct needle users in decontamination methods and needle exchange have been shown to be effective.
- HIV testing and counseling is an important intervention raising awareness of HIV status, promoting behavioral change and diagnosing HIV infection.
- Pregnant women should be counseled about HIV early in pregnancy and where culturally and socially appropriate, encourage a HIV test as a routine part of standard antenatal care.
- Care must be taken in handling, using and disposing of needles or other sharp instruments.
- Health care workers should wear latex gloves, eye protection and other personal protective equipment in order to avoid contact with blood or other bodily fluids.
- The risk of transmission from a HIV infected pregnant woman to her baby is significantly reduced if the mother takes zidovudine, or other anti-retroviral agents during pregnancy, labor, and delivery, and if her baby is treated for the first six weeks of life.

Chemoprophylaxis:

All sexual partners and needle-sharing partners should be evaluated and tested for HIV/AIDS as well as infants born to mothers with HIV/AIDS.

Vaccine:

None .

Isolation and quarantine requirements:

Isolation: Avoid unprotected sexual contact

Hospital: Standard body substance precautions.

Quarantine: Not applicable

CASE INVESTIGATION

Reporting:

HIV infection and AIDS are reportable diseases.

Case definition:

HIV (1999):

This revised definition of HIV infection, which applies to any HIV (e.g., HIV-1 or HIV-2), is intended for public health surveillance only. It incorporates the reporting criteria for HIV infection and AIDS into a single case definition. The revised criteria for HIV infection updates the definition of HIV infection implemented in 1993; the revised HIV criteria apply to AIDS-defining conditions for adults and children, which require laboratory evidence of HIV. This definition is not presented as a guide to clinical diagnosis or for other uses.

1. In adults, adolescents, or children aged greater than or equal to 18 months, a reportable case of HIV infection must meet at least one of the following criteria:**

Laboratory Criteria:

- Positive result on a screening test for HIV antibody (e.g., repeatedly reactive enzyme immunoassay), followed by a positive result on a confirmatory (sensitive and more specific) test for HIV antibody (e.g., Western blot or immunofluorescence antibody test), or
- Positive result or report of a detectable quantity on any of the following HIV virologic (non-antibody) tests:
 - HIV nucleic acid (DNA or RNA) detection (e.g., DNA polymerase chain reaction [PCR] or plasma HIV-1 RNA)
 - HIV p24 antigen test, including neutralization assay
 - HIV isolation (viral culture)

Or, if the above laboratory criteria are not met

Clinical or other Criteria:

- Diagnosis of HIV infection, based on the laboratory criteria above, that is documented in a medical record by a physician, or
- Conditions that meet criteria included in the case definition for [AIDS](#).

2. In a child aged less than 18 months, a reportable case of HIV infection must meet at least one of the following criteria:

Laboratory criteria:

Definitive:

- Positive results on two separate specimens (excluding cord blood) using one or more of the following HIV virologic (non-antibody) tests:
 - HIV nucleic acid (DNA or RNA) detection
 - HIV p24 antigen test, including neutralization assay, in a child greater than or equal to 1 month of age
 - HIV isolation (viral culture)

Presumptive:

A child who does not meet the criteria for definitive HIV infection but who has:

- Positive results on only one specimen (excluding cord blood) using the above HIV virologic tests and no subsequent negative HIV virologic or negative HIV antibody tests

Or if the above definitive or presumptive laboratory criteria are not met:

- Diagnosis of HIV infection, based on the laboratory criteria above, that is documented in a medical record by a physician, or
- Conditions that meet criteria included in the 1987 pediatric surveillance case definition for AIDS

3. A child aged less than 18 months born to an HIV-infected mother will be categorized for surveillance purposes as “not infected with HIV” if the child does not meet the criteria for HIV infection but meets the following criteria:

Laboratory Criteria:

Definitive:

- Two negative RNA or DNA virologic tests of which both specimens were obtained at greater than or equal to 2 weeks of age and one which was obtained greater than or equal to 4 weeks of age, OR
- At least two negative HIV antibody tests from separate specimens obtained at greater than or equal to 6 months of age, OR
- At least two negative HIV virologic tests from separate specimens, both of which were performed at greater than or equal to 1 month of age and one of which was performed at greater than or equal to 4 months of age

AND

- No other laboratory or clinical evidence of HIV infection (i.e., has not had any positive virologic tests, if performed, and has not had an AIDS-defining condition).

Presumptive:

A child who does not meet the above criteria for definitive “not infected” status but who has:

- One negative EIA HIV antibody test performed at greater than or equal to 6 months of age and NO positive HIV virologic tests, if performed, OR
- One negative HIV virologic test performed at greater than or equal to 4 months of age and NO positive HIV virologic tests, if performed, OR
- One positive HIV virologic test with at least two subsequent negative virologic test, at least one of which is at greater than or equal to 4 months of age; or negative HIV antibody test results, at least one of which is at greater than or equal to 6 months of age

AND

- No other laboratory or clinical evidence of HIV infection (i.e., has not had any positive virologic tests, if performed, and has not had an AIDS-defining condition).

OR, if the above definitive or presumptive laboratory criteria are not met:

Clinical or other criteria:

- Determined by a physician to be “not infected”, and a physician has noted the results of the preceding HIV diagnostic tests in the medical record

AND

No other laboratory or clinical evidence of HIV infection (i.e., has not had any positive virologic tests, if performed, and has not had an AIDS-defining condition)

4. A child aged less than 18 months born to an HIV-infected mother will be categorized as having perinatal exposure to HIV infection if the child does not meet the criteria for HIV infection or the criteria for “not infected with HIV”

Case definition:

AIDS (1999):
Clinical Description

AIDS, as defined by a CD4+ T cell count of <200 cells/uL or <14% total lymphocytes, or by the diagnosis of any of 26 AIDS indicator opportunistic illnesses (OIs) as defined by the CDC, shall be reported by name to the UDOH or the local health department where the patient resides by physicians, other health care providers, and laboratories to the UDOH or the local health department via telephone, in writing, or through other electronic means deemed acceptable by the UDOH.

Case Classification

The Centers for Disease Control and Prevention (CDC) has developed official criteria for the definition of AIDS and is responsible for tracking AIDS in the U.S. The definition has been expanded to include all human immunodeficiency virus (HIV)-infected adolescents and adults aged ≥ 13 years who have either:

- <200 CD4+ T-lymphocytes/uL;
- A CD4+ T-lymphocyte percentage of total lymphocytes <14%; or
- Any of the following three clinical conditions:
 - Pulmonary tuberculosis,
 - Recurrent pneumonia, or
 - Invasive cervical cancer.

The expanded definition also retains 23 additional clinical conditions that affect people with advanced HIV disease. These clinical conditions include the following:

- Candidiasis of bronchi, trachea, or lungs
- Candidiasis esophageal
- Cervical cancer (invasive)
- Coccidioidomycosis, disseminated or extrapulmonary
- Cryptococcosis, extrapulmonary
- Cryptosporidiosis, chronic intestinal for longer than 1 month
- Cytomegalovirus disease (other than liver, spleen or lymph nodes)
- Cytomegalovirus retinitis (with loss of vision)
- Encephalopathy (HIV-related)
- Herpes simplex: chronic ulcer(s) (for more than 1 month); or bronchitis, pneumonitis, or esophagitis
- Histoplasmosis, disseminated or extrapulmonary
- Isosporiasis, chronic intestinal (for more than 1 month)
- Kaposi's sarcoma
- Lymphoma Burkitt's, immunoblastic or primary brain
- Mycobacterium avium complex
- Mycobacterium, other species, disseminated or extrapulmonary
- Pneumocystis jiroveci pneumonia (formerly Pneumocystis carinii)
- Pneumonia (recurrent)
- Progressive multifocal leukoencephalopathy
- Salmonella septicemia (recurrent)
- Toxoplasmosis of the brain
- Tuberculosis
- Wasting syndrome due to HIV

Case Investigation Process:

- Fill out a morbidity form
- Fill out the Interview Record Form
- Conduct a client interview
- Fill out field records on contacts
- Conduct field investigations on contacts
- Follow-up and/or re-test contacts if needed
- Re-interview client

Outbreaks:

A HIV/AIDS outbreak occurs when the observed rate of disease in a geographical area exceeds the 5 year average by 2 standard deviations. UDOH will notify LHDs when this occurs.

Identification of case contacts:

The contact investigation is an integral part of finding contacts. Patients should be instructed to identify their sex partners and needle-sharing partners for testing.

Case contact management:

All contacts should be evaluated, and tested if they had sexual contact or shared a needle with the patient during the 12 months preceding the diagnosis of the patient, or six months from the patient's last negative test, or if married during the past 10 years. If sexual contact or needle sharing occurred during the preceding three months (window period), then these contacts need to be re-tested after three months of their last contact.

REFERENCES

American Academy of Pediatrics. [Human Immunodeficiency Virus Infection.] In: Pickering L.K., ed. *Red Book: 2003 Report of the Committee on Infectious Diseases*, 26th Edition. Elk Grove Village, IL, American Academy of Pediatrics; 2003: 360–382.

“Exploring. HIV Infection and AIDS: An Overview.” National Institute of Allergy and Infectious Diseases. March 2005.
<www.niaid.nih.gov/factsheets/hivinf.htm>.

“Exploring. How HIV Causes AIDS.” National Institute of Allergy and Infectious Diseases. November 2004.
<www.niaid.nih.gov/factsheets/howhiv.htm>.

“Fact Sheet. HIV and Its Transmission.” Centers for Disease Control and Prevention, National Center for HIV, STD and TB Prevention, Division of HIV/AIDS Prevention. September 2003.
<www.cdc.gov/hiv/pubs/facts/transmission.htm>.

“Facts & Figures. HIV/AIDS Statistics.” National Institute of Allergy and Infectious Diseases. October 2005.

<www.niaid.nih.gov/factsheets/aidsstat.htm>.

UDOH. Communicable Disease Rule R388-803: HIV Test Reporting. Authority for this rule is established in Title 26, Chapter 6, Sections 3 and 3.5 of the Communicable Disease Control Act.

Centers for Disease Control, Case Definitions for Infectious Conditions Under Public Health Surveillance. MMWR 46 (RR-10), 1997.1

Control of Communicable Diseases Manual (18th Edition), Heymann, D.L., Ed; 2004.

Red Book: 2003 Report of the Committee on Infectious Diseases (26th Edition), Larry K. Pickering MD, Ed; 2003.

Principles and Practice of Infectious Disease (6th Edition), Gerald L. Mandell, John E. Bennett, and Raphael Dolin Eds; 2005.

Massachusetts Department of Public Health, Guide to Surveillance, Reporting and Control, 2006.

ARUP Labs; Physician’s Guide to Laboratory Test Selection and Interpretation

Sexually Transmitted Diseases (3rd Edition), King K. Holmes, P Frederick Sparling, Der-Anders Mardh, Stanley M. Lemon, Walter E. Stamm, Peter Piot, Judith N. Wasserheit, 1999

CDC, Sexually Transmitted Diseases Treatment Guidelines, 2006